

PROGRESS OF MEDICINE IN THE NINETEENTH CENTURY.

BY

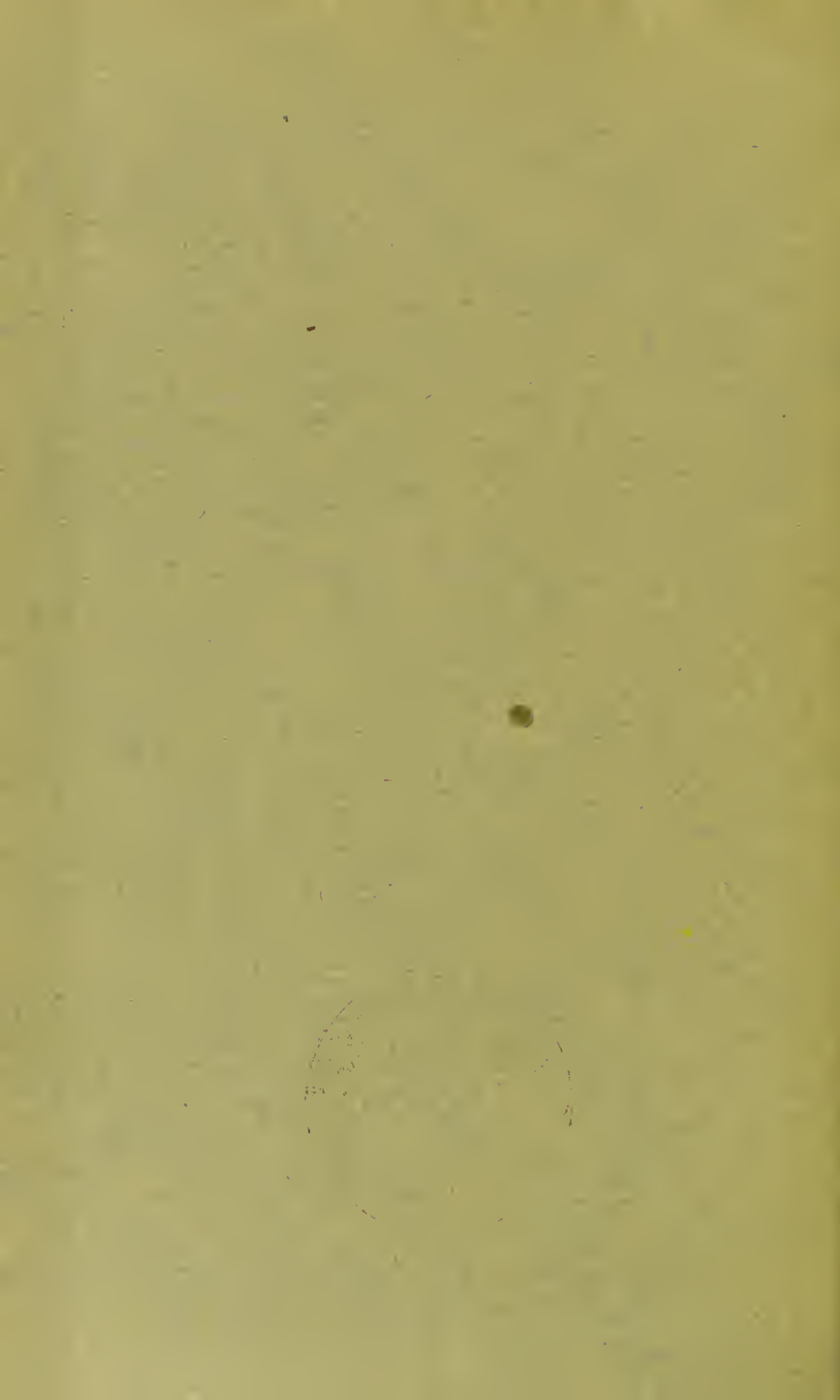
DR. JOHN S. BILLINGS, U. S. A.,
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The word "medicine," as used in the title of this paper, includes all branches of the art of prevention and treatment of disease and injuries; all discoveries of methods of diminishing physical pain and of prolonging life, and also that part of modern science which is concerned with accurate knowledge of the structure and functions, normal and abnormal, of the human body, and of the causes of disease. In other words, it includes not only therapeutics, medical and surgical, but also physiology, pathology, and hygiene.

In all these branches of medicine greater progress has been made during the last century than had been made during the previous two thousand years. This progress has been largely due to improvements in methods of investigation and diagnosis, resulting from increase of knowledge in chemistry and physics; to better microscopes and new instruments of precision; to experimental work in laboratories, and to the application of scientific method and system in the observation and recording of cases of disease and of the results of different modes of treatment. The introduction of statistical methods in the study of cases of disease and of causes of death; the discovery of general anesthetics; the adoption of antiseptic and aseptic methods in surgery, and the development of modern bacteriology, each marks a point in the history of medicine in the nineteenth century.

The scientific demonstration that some diseases are due to the growth and development of certain specific micro-organisms in the human body dates from about twenty years ago, although the theory of such causal relation is much older. Since 1880 it has been proved that anthrax, Asiatic cholera, cerebro-spinal meningitis, diphtheria, one form of dysentery, erysipelas, glanders, gonorrhea, influenza, certain epidemics of meat poisoning, pyæmia and suppuration in general, pneumonia, tetanus, relapsing fever, tuberculosis, bubonic plague, and typhoid fever are due to minute vegetable organisms known as bacteria; that malarial fevers, Texas cattle fever, and certain forms of dysentery are due to forms of microscopic animal organisms known as

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microzoa; and for most of these diseases the mode of development and means of introduction of the micro-organism into the body are fairly well understood. To the information thus obtained we owe the triumphs of antiseptic and aseptic surgery, a great increase of precision in diagnosis, the use of specific antitoxin as remedies and as preventives, and some of the best practical work in public hygiene.

The evidence as to the increased powers of medicine to give relief from suffering and to prolong life is most clear and direct in the records of modern surgery—particularly in some of its special branches. In a large proportion of certain cases in which the surgeon now operates with a fair chance of success, such as calculus in the kidney or gall bladder, shot wounds in the abdomen, and tumors of various kinds, there was no hope in the year 1800, and the unhappy sufferer could only expect a certain, though often a lingering and painful, death. In cases of cancer of the face, tongue, breast, or uterus, the persistent pain, extreme disfigurement, and offensive odors which attended them made death a boon to be prayed for, if not deliberately sought, while now such cases, if brought in time to the surgeon, can often be entirely relieved. The knowledge of this fact has become general with the public, and patients no longer defer an operation as long as possible, as was their custom in days of old. Instead of having to look forward to the torture of incisions, manipulations, and stitching, with but small hope of surviving the exhausting suppuration and blood poisoning which were such common results, the patient now knows that he will inhale a little sweet vapor, and sleep unconscious of the strokes of the surgeon's knife or the pricks of his needle. He may dream wondrous dreams, but will soon awake to find himself in his bed staring at his trained nurse standing by his side, and wondering vaguely why the operation has not begun. He does not have to look forward to weeks and even months of daily dressings. The surgeon will glance at his temperature record and at the outside of his bandages, but will probably not touch them for a week; and when he does remove them there will be nothing to be seen but a narrow red line without a trace of suppuration. These improved methods not only preserve the mother for her children, and the bread winner for the family, but they greatly contribute to the public good by shortening the period of enforced idleness and unproductivity after operations.

Some of the greatest triumphs of modern surgery are obtained in cases of disease or injury of the abdominal organs. The removal of ovarian and uterine tumors is now so common and successful that it is not easy to realize that a hundred years ago there was practically no help or hope for such cases. In former days the lists of deaths contained many cases reported as inflammation or obstruction of the bowels, or as peritonitis. It is now well understood that most of these cases are due to disease of a little worm-like appendix connected with

the large intestine on the right side of the lower part of the abdomen, inflammation of which, known as appendicitis, causes excruciating pain and often produces internal abscesses and death. An operation for the removal of such a diseased appendix is now common, and, in most cases, successful. The operation for the removal of calculus or stone from the urinary bladder dates from over two thousand five hundred years ago, and no one knows who first performed it. Within the last century it has been largely superseded by an operation which crushes the stone to powder within the bladder, and removes this powder without the use of the knife. The removal of calculi from the kidney, or from the gall bladder, and the removal of a diseased kidney are new operations, made possible by improved means of diagnosis, anæsthesia, and antisepsis. Wounds of the intestines were formerly thought to be almost necessarily fatal, and nothing was done for them except to stupefy the patient with opium. Now, in such cases, the abdomen is opened, the lacerations of the bowel are closed, the effused blood and other matters are removed, and in many cases life has thus been preserved.

By increase of knowledge of the anatomy of the brain, and of the distribution of nerves connected with it, it has become possible in a certain number of cases to determine what part of the brain is suffering from irritation or pressure, and to operate for the removal of the tumor or other substance causing the trouble, with considerable hope of giving permanent relief. A branch of surgery which has developed into an important specialty during the last century is that known as plastic and orthopædic surgery. The replacing of a lost nose by engrafting other tissue in its place is a very old triumph of surgical art, but operations of this kind have been greatly extended and perfected within the last hundred years, and much can now be done to mitigate the deformity and weakness due to club feet, bandy legs, contracted joints, etc., which formerly were considered to be beyond remedy.

Many of the diseases peculiar to women have been deprived of much of their terrors within a hundred years. In 1800 for every thousand children born, from ten to twenty mothers died. Puerperal fever occurred in epidemics, following certain physicians or nurses, but nothing was known as to its causes or nature. To-day puerperal fever is almost unknown in the hospitals or in the practice of a skilled physician. The death rate of mothers is less than five per thousand births, and the mechanical obstructions which a century ago would have almost certainly brought about the death of both mother and child are now so dealt with that more than half of both mothers and children are saved.

The study of the diseases of the eye has greatly developed another specialty during the century, viz, ophthalmology. The investigations

of Helmholtz in physiological optics, with his invention of the ophthalmoscope in 1852, effected a revolution in this branch of medical science and art and have added greatly to human comfort and happiness. A hundred years ago, when the physician saw the eyelids of the newborn babe redden and swell and yellow matter ooze from between them, he knew that in a few days or weeks the child would be partially or wholly blind, but he knew nothing of the simple means by which the skilled physician can now prevent such a calamity. It is unfortunately true that this knowledge is not even now sufficiently widely diffused and that our blind asylums must, for some time to come, continue to receive those who have been deprived of sight during the first months of their life through the ignorance or neglect of those who should have properly cared for them.

While it is certain that the death rates in the last century were greater than those of the present day, it is not possible to make precise comparisons. The record of deaths in the city of New York begins with 1804, and was necessarily very imperfect until the law of 1851, which required the registration of all deaths; but it shows a death rate of 30.2 per 1,000 in 1805, which means that the true death rate must have been between 35 and 40. At present, for a series of five years, it would be about 20, having been below 19 in 1899, so that the death rate has been diminished by at least one-third. How much of this is due to improved methods of treatment, and how much to improved sanitary conditions, it is impossible to say. A comparison of the list of causes of death in 1805 with the list of causes for this year shows great differences, but much of this is due to changes in name and to more accurate diagnosis.

"Malignant sore throat" and "croup" were well known to anxious parents in 1800, but "diphtheria" caused no anxiety. "Inflammation of the bowels" was common and fatal, but "appendicitis" had not been heard of. Nervous fever, continued fever, and low fever were on the lists, but not typhoid, which was not clearly distinguished as a special form of disease until 1837, when Dr. Gerhard, an American physician, pointed out the differences between it and typhus, which also prevailed at the commencement of the century.

One hundred years ago the great topic of discussion in our cities on the North Atlantic coast was the means of preventing yellow fever, which had been epidemic in New York and Philadelphia for two years. Physicians were disputing as to whether the disease was contagious and imported, and therefore perhaps preventable by quarantine and disinfection, or was due to some occult condition of the atmosphere (which was the view taken by Noah Webster in his history of epidemic and pestilential diseases, a work which appeared about the middle of the year 1800, although it is dated 1798). The discussions remind one

of the remark that a certain patented form of electric light was surrounded by a cloud of nonluminous verbosity. For example, the committee of the Medical Society of the State of New York reported that yellow fever may be produced in any country by pestilential effluvia; and Webster concluded that typhus and nervous fevers were due to a "conversion of the perspirable fluids of the body into septic matter"—all of which means that they knew nothing about it. Even now we do not know the cause of yellow fever, or the precise mode of its spread; but we are sufficiently certain that it is due to a specific micro-organism to be confident that its spread can be checked by isolation and disinfection properly applied—and Memphis and New Orleans are witnesses of the truth of this.

In the year 1800 the majority of persons over 20 years old were more or less pitted by smallpox, being the survivors of a much greater number who had suffered from this disease. Dr. Miller in New York had just received from England a thread which had been steeped in the newly discovered vaccine matter, and was about to begin vaccination in that city. To-day there are many physicians who have never seen a case of smallpox, and a face pitted with the marks of this disease is rarely seen. During the century there have appeared in civilized countries two strange and unfamiliar forms of epidemic disease, namely, Asiatic cholera and the plague, the first coming from the valley of the Ganges, the second from the valley of the Euphrates, and each having a long history. A really new disease was the outbreak in Paris in 1892 of a specific contagious disease transmitted from sick parrots, and known as psittacosis. This little epidemic affected 49 persons and caused 16 deaths. Typhus fever has almost disappeared, while some diseases have increased in relative frequency, in part at least because of medical progress. The children who would have died of smallpox in the eighteenth century now live to be affected with diphtheria or scarlet fever, and the increase in the number of deaths reported as due to cancer is partly due to the fact that a greater proportion of people live to the age most subject to this disease.

A large part of modern progress in medicine is due to improved methods of diagnosis and to the use of instruments of precision for recording the results of examinations. The use of the clinical thermometer has effected a revolution in medical practice. Our knowledge of diseases of the heart and lungs has been greatly expanded during the century by auscultation and percussion, and especially by the use of the stethoscope. The test tube and the microscope warn us of kidney troubles, which formerly would not have been suspected, and the mysterious Roentgen rays are called in to aid the surgeon in locating foreign bodies and in determining the precise nature of certain injuries of the bones. Bacteriological examination has become a

necessary part of the examination in cases of suspected diphtheria, tuberclosis, or typhoid, and a minute drop of blood under the microscope may furnish data which will enable the skilled physician to predict the result in certain cases of anæmia, or to make a positive diagnosis as between malaria and other obscure forms of periodic fever.

The means at the command of the physician for the relief of pain now include, not only the general anæsthetics—chloroform, ether, and nitrous oxide—but also the hypodermic use of the concentrated alkaloïds of opium, belladonna, and other narcotics, and the local use of cocaine; and restful sleep for the weary brain may be obtained by sulphonal, chloral, etc. Some agonizing forms of neuralgic pain are now promptly relieved by the section or excision of a portion of the affected nerve, or it may be forcibly stretched into a condition of innocuous desuetude. Relief to the sufferings of thousands of neurotic women, and of their families and friends, has been produced by the systematic scientific application of the rest cure of Dr. Weir Mitchell.

A hundred years ago the medical advertisement which was most prominent in New York and Philadelphia newspapers was one of a remedy for worms. Many symptoms of nervous and digestive troubles in children were in those days wrongly attributed to worms. Nevertheless there is good reason to believe that parasitic diseases derived from animals were much more prevalent in those days in this country than they are to-day. Our knowledge of the mode of origin and development of the tapeworm, the *Trichina spiralis*, the liver fluke, and the itch insect has been gained during the nineteenth century. Much the same may be said with regard to the peculiar worm known as *Anchylostomum*, the cause of Egyptian chlorosis and of the St. Gothard tunnel disease, although prescriptions for this parasite are found in the Papyrus Ebers, written before the time of Pharaoh.

The limits of this article permit of but a brief reference to the progress in preventive medicine during the century. The studies made in England of the results of the cholera epidemic of 1849, and the experience gained in the English army during the Crimean war, led to some of the most important advances in sanitary science, more especially to the demonstration of the importance of pure water supplies and of proper drainage and sewerage. During our Revolutionary war and the Napoleonic wars the losses to the armies from disease greatly exceeded those from wounds; and hospital fever—in other words, typhus—was dreaded by a general almost more than the opposing forces. During the wars of the last twenty-five years typhus and hospital gangrene have been unknown, but some extensive outbreaks of typhoid fever have occurred, showing that our knowledge of the causes and mode of transmission of this disease has not been practically applied to the extent which it should have been. This remark applies also to some of the most fatal diseases in civil life. In the

United States diphtheria and typhoid fever each causes from 20,000 to 30,000 deaths a year, while more than 100,000 deaths are annually due to consumption. Yet for each of these diseases we know the specific germ, the channels through which it is usually conveyed, and the means by which this conveyance can be to a great extent prevented. The ravages of these diseases are therefore largely due to the fact that the great mass of the people are still ignorant on these subjects. Antitoxin is not yet used for either prevention or treatment in diphtheria to anything like the extent which our knowledge of its powers demands.

Our better knowledge of the causes of certain infectious and contagious diseases and of the mode of their spread has been of great importance to the world from a purely commercial point of view, since it has led to the doing away with many unnecessary obstructions to traffic and travel, which were connected with the old systems of quarantine, while the security which has been gained from the modern method of cleansing and disinfection is decidedly greater than that secured by the old methods. A striking illustration of the effect of these improvements is seen in the manner in which the news of the recent outbreak of plague in Glasgow was received in England and throughout Europe. One hundred years ago the city would have been almost deserted, and terror would have reigned in all England. To-day it is well understood that the disease spreads by a bacillus which is not conveyed through the air. No one fears a repetition of the ghastly scenes of the Black Death in the fourteenth century. In like manner and for the same reasons Asiatic cholera has lost most of its terrors.

The benefits to the public of modern progress in medicine have been greatly enlarged by the establishment of many small hospitals and by the steady increase in the employment of specially trained nurses in private practice, even in rural districts. The result of a case of typhoid or of pneumonia often depends as much upon the nurse as upon the doctor, and affection can not take the place of skill in either. For the great mass of the people cases of severe illness or injury, or those requiring major surgical operations, can be treated more successfully in well-appointed hospitals than in private houses, and as this is becoming generally understood the old feeling against entering a hospital for treatment is rapidly disappearing. Improvement in hospital construction and management has kept pace with progress in medical knowledge, and in future such institutions seem destined to play an increasingly important part in municipal and village life.

All progress in civilization is attended with injury to some individuals. Trained nurses have deprived some unskilled labor of employment, hospitals have injured the business of some physicians, pure water supplies, good sewers, food inspection, vaccination—in short,

all effective measures in public hygiene—interfere with the trade side of medical practice; but upon the whole the public at large benefits by all these things. In one sense they seem opposed to the general law of evolution in that they prolong the life of the unfit; but in a broader sense they work in accordance with this law by increasing the power of the strong to protect and care for the weak.

All told, the most important feature in the progress of medicine during the century has been the discovery of new methods of scientific investigation, more especially in the fields of bacteriology and pathology. These methods have been as yet only partially applied, and great results are to be hoped from their extension in the near future. They will not lead to the discovery of an elixir of life, and the increasing feebleness of old age will continue to be the certain result of living a long time, for the tissues and organs of each man have a definitely limited term of duration peculiar to himself; but many of the disorders which make life a burden in advancing years, can now be palliated or so dealt with as to secure comparative comfort to the patient, so that “if by reason of strength” life can be prolonged beyond three-score years and ten, it no longer necessarily involves labor and sorrow.